

## Chapter # 6 – Using Networks.

### Specimen 2017

#### Question 8, Part (b) and (c) only

- (b) Discuss the reasons why many people use the internet for communication, while some people do not.

#### Answer:

8(b)	<p>To be marked as a level of response:</p> <p><b>Level 3 (7–8 marks)</b>  Candidates will address both aspects of the question and discuss/consider different reasons as to why not all people use the internet for communication.  The issues raised will be justified. There will be a reasoned conclusion.  The information will be relevant, clear, organised and presented in a structured and coherent format.</p> <p><b>Level 2 (4–6 marks)</b>  Candidates will address both aspects of the question and discuss/consider different uses, although development of some of the points will be limited to one aspect of the question.  There will be a conclusion.  For the most part the information will be relevant and presented in a structured and coherent format.</p> <p><b>Level 1 (1–3 marks)</b>  Candidates may only address one aspect, and give basic reasons.  Answers may be simplistic with little or no relevance.</p> <p><b>Level 0 (0 marks)</b>  Response with no valid comment.</p>	<b>8</b>
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**Question 8, Part (b)**

	<p><b>Examples:</b></p> <p>Why people use the internet:</p> <p>Individuals send emails to communicate with others to gain a reply speedily          Social networking to communicate with friends and family members          Communication – between companies using IM, VOIP and web/audio/video conferencing because cheaper than organising face-to-face meetings          News services – to find the latest news or sports scores</p> <p>Why people do not use the internet:</p> <p>Some may be reluctant to send emails because of malware, speed of reply, impersonal nature          People may not want their children to use the internet because of esafety, and children could become addicted and not do their work          Those that do not use the internet are mainly those that suffer as the result of the digital divide          People and regions that do not have access to aspects of modern technology, or those that have restricted access          Can be people who live in rural areas          Can be people who are uneducated          Can be people who are poor          Can be people who are older who do not wish to learn to use it          Some might prefer face-to-face contact</p>	
8(b)	<p>Can be people who reside in less industrially developed nations          Can be people who have lower-performance computers...          ...lower-speed wireless connections...          ...lower-priced connections such as dial-up...          ...and limited access to subscription-based content          Smaller, traditional companies may be reluctant because of cost/security issues          Many people prefer to read hard copies of newspapers as they can take a newspaper with them and read it anywhere</p>	

**Question 8, Part (c)**

- (c) Explain what is meant by the internet and the World Wide Web. In your answer include features of the internet which do **not** use the World Wide Web.

**Answer:**

8(c)	<p>Award 1 mark for each correct answer up to a maximum of 6.</p> <p><b>Six from:</b></p> <p>The internet is an international network of networks of computers  The internet consists of hardware  The World Wide Web makes use of hypertext to access the various forms of information available on the internet  The World Wide Web is the system used to access the internet  The web is accessed through browsers  The World Wide Web is not the only service provided on the internet  Other uses of the internet include email and instant messaging</p>	<b>6</b>
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## June 2017 – P11 & P12

1 Tick the **four** most accurate statements regarding LANs and WANs.

	✓
A WAN is a Wireless Area Network.	
A LAN is a Live Area Network.	
A LAN covers a smaller geographical area than a WAN.	
A WAN has a higher data transfer rate than a LAN.	
Unlike a LAN, the signal does not deteriorate in a WAN.	
A LAN does not need a router to connect computers together.	
A WAN experiences more data transmission errors than a LAN.	
A WAN has a lower bandwidth than a LAN.	
The internet is an example of a LAN.	
A WAN is more secure than a LAN.	

[4]

Answer:

1	A WAN is a Wireless Area Network.	
	A LAN is a Live Area Network.	
	A LAN covers a smaller geographical area than a WAN.	✓
	A WAN has a higher data transfer rate than a LAN.	
	Unlike a LAN, the signal does not deteriorate in a WAN.	
	A LAN does not need a router to connect computers together.	✓
	A WAN experiences more data transmission errors than a LAN.	✓
	A WAN has a lower bandwidth than a LAN.	✓
	The internet is an example of a LAN.	
	A WAN is more secure than a LAN.	

4
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- 11** Rajvinder and his team of car designers are producing designs for a new model. Their office is on the other side of town from the company's head office. Every month, Rajvinder and the designers report to the company directors by means of a web conference.

Describe how Rajvinder would set up this web conference, assuming that he is using a third party to supply the service and that he has checked that all the hardware and software is working.

Answer:

11	<p><b>Six from:</b></p> <p>Send emails to every person being invited informing them of the conference</p> <p>Rajvinder sends log in details to the directors/users</p> <p>Uploads any necessary documents for the meeting</p> <p>Sends a link to the website</p> <p>Enter his user name and password (obtained from the provider)</p> <p>Select a start time and end time</p> <p>In the meeting area, type an agenda</p> <p>Using the software select participants</p> <p>Select appropriate meeting space/room</p> <p>Select those participants who can enter the room</p> <p>Choose those who can be presenters/those that can modify documents</p> <p>Limit the participation of participants/mute volume/disable messaging/disable cameras.</p>	6
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## June 2017 – P13

7 Many people use computers to access services provided by the internet.

(a) Explain what is meant by the internet.

Answer:

7(a)	<p><b>Two from:</b></p> <p>It is the global system of interconnected computer networks  It uses the Internet protocol suite (TCP/IP) to link devices  It is a network of networks linked by an array of electronic, wireless, and optical networking technologies.</p>	<b>2</b>
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(b) Describe **six** of the services that are provided by the internet.

Answer:

7(b)	<p><b>Six from:</b></p> <p>Electronic Mail – email is a message that may contain text, files, images, or other attachments sent through a network to a specified individual or group of individuals</p> <p>World Wide Web – The World Wide Web is a system of Internet servers that support specially formatted HTML documents</p> <p>Video Conferencing Services – to conduct a conference between two or more participants at different sites by using computer networks to transmit audio and video data</p> <p>VoIP- Voice over Internet Protocol – the delivery of voice communications and multimedia sessions over Internet Protocol (IP) networks</p> <p>Instant messaging – to communicate via messages in real time over the internet</p> <p>Video streaming – video is sent to the viewer in real time</p> <p>File transfer – transmitting files over a computer network like the internet.</p>	<b>6</b>
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- 9 Bruce works from home but is able to access company data using a virtual private network (VPN).

Describe the benefits and drawbacks for Bruce of using a VPN.

Answer:

9	<p><b>Six from:</b></p> <p><i>Benefits</i>  Offer a much higher level of secure communication when compared to other remote methods of communication  Every file coming into a computer or going out from a computer is encrypted...  ... meaning no unwanted user will be able to open the files  Can be used to work automatically as part of logging on</p> <p><i>Drawbacks</i>  The company may not permit him to use other third party software on his computer in order to safeguard the integrity of their VPN connection  The use of mobile devices to initiate access to the virtual private network can cause security issues...  ...if Bruce's local wireless network is not secure  Packet loss will be higher with the VPN and cause data to be lost and need to be retransmitted...  ...increasing the time taken to receive documents  The connection depends on the ISP and so performance can be variable  Will need to install extra anti- malware tools to ensure his PC is clean in order to comply with VPN suppliers' requirements.</p> <p>Must have at least two of each to gain full marks.</p>	6
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## November 2017 – P13

- 2 Tick the **four** statements referring to the use of the internet and the World Wide Web which are true.

	✓
The internet is fully policed and safe.	
Information on the World Wide Web tends to be up to date.	
The World Wide Web has vast amounts of information.	
All information on the World Wide Web is unbiased.	
All websites are accurate.	
Lack of expertise in using search engines can lead to inefficient searching.	
It is more difficult to plagiarise information using the World Wide Web than copying out of a hard copy book.	
There is a danger of accessing inappropriate websites.	
The internet is smaller than an intranet.	
The World Wide Web and the internet are the same thing.	

[4]



**Question 2****Answer:**

2	The internet is fully policed and safe.	
	Information on the world wide web tends to be up to date.	✓
	The world wide web has vast amounts of information.	✓
	All information on the world wide web is unbiased.	
	All websites are accurate.	
	Lack of expertise in using search engines can lead to inefficient searching.	✓
	It is more difficult to plagiarise information using the world wide web than copying out of a hard copy book.	
	There is a danger of accessing inappropriate websites.	✓
	The internet is smaller than an intranet.	
	The world wide web and the internet are the same thing.	

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- 12** Paul and his team of programmers are writing software for a new project for a large company. Every month, Paul and the programmers report to the company directors by means of a video-conference.

Describe how Paul would set up and run this video-conference, assuming that the necessary equipment and software has already been purchased and tested.

Answer:

12	<p><b>Six from:</b></p> <p>Agree a date and time          Send a reminder/invitation to the participants shortly before start....          .... including access to password/PIN          Adjust webcam so they can be seen          Create and enter virtual room(s)/environment          Load/examine/share documents using appropriate software          Uploads any necessary documents for the meeting          Sends a link to the website          Enter his user name and password          Using the software select participants          Select appropriate meeting space/room          Select those participants who can enter the room          Limit the participation of participants/mute volume/disable messaging/disable cameras          Communicate by speaking into a microphone and looking at the webcam.</p>	<b>6</b>
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## March 2017 – P12

### Question 5, Part (b) only

- (b) There are a number of computers in the school which are not networked at the moment. Discuss the advantages and disadvantages of creating a new network using these computers.

#### Answer:

5(b)	<p>To be marked as a level of response:</p> <p><b>Level 3 (7–8 marks)</b>  Candidates will analyse and evaluate both sides of the argument and discuss/consider different reasons as to why the computers should be networked or not  The issues raised will be justified  The information will be relevant, clear, organised and presented in a structured and coherent format  Subject specific terminology will be used accurately and appropriately  There will need to be a reasoned conclusion to gain full marks</p> <p><b>Level 2 (4–6 marks)</b>  Candidates will analyse and evaluate both sides of the argument and discuss/consider different reasons as to why the computers should be networked or not although development of some of the points will be limited to one aspect of the question  For the most part the information will be relevant and presented in a structured and coherent format  Subject specific terminology will be used appropriately and for the most part correctly  There may be a conclusion</p> <p><b>Level 1 (1–3 marks)</b>  Candidates may only address one side of the argument, and give basic reasons  Answers may be simplistic with little or no relevance  There will be little or no use of specialist terms</p> <p><b>Level 0 (0 marks)</b>  Response with no valid content</p>	<b>8</b>
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**Question 5, Part (b)****Answer (Continued):**

	<p>Advantages may include e.g.:</p> <ul style="list-style-type: none"> <li>Easier for students to share work/files in group projects</li> <li>Easier for network manager to roll out new software</li> <li>Easier for teachers to monitor students when working</li> <li>Peripherals can be shared so fewer needed leading to lower cost in the future</li> <li>Can access the internet more easily</li> <li>School intranet would become available to all students more frequently</li> </ul> <p>Disadvantages may include e.g.:</p> <ul style="list-style-type: none"> <li>Easier for students to share work which could lead to copying</li> <li>Bigger server may be required to cope with extra computers so more expensive</li> <li>Extra network points may be needed which leads to more cost</li> <li>If the server breaks down student work might become inaccessible</li> <li>Viruses are easier to transmit from one computer to another</li> </ul>	
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## June 2018 – P11

- 5 People working away from their office are able to make use of their company's network through a VPN.

Explain what is meant by a VPN.

### Answer:

5	<p><b>Six from:</b></p> <p>A virtual private network          Is not physically a private network          It uses the internet or another WAN to transmit data          The data remains encrypted throughout transmission          Data is only decrypted at the destination computer          This process is called tunnelling as it uses a secure means to tunnel through a publicly accessible network          Uses public telecommunication systems          Normally consists of LANs that may be remote from each other...          ...such as different branches of an organisation          It enables organisations to communicate over a large area          It is cheaper than creating a conventional WAN          The security used consists of firewalls, encryption, the use of IP security (IPsec).</p>	6
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**12** Many people use the internet on a daily basis to communicate with others.

Discuss the benefits and drawbacks of individuals using the internet to communicate with each other.

Answer:

12	<p><b>Eight from:</b></p> <p><i>Benefits</i>          It is relatively easy to communicate with anybody locally or anywhere in the world regardless of where they are          You can respond to friends quickly          Messages can be received quickly          The cost of sending messages by email/social networking/ instant messaging is very low unlike postage or normal phone calls          The cost of using VOIP is very low unlike postage or normal phone calls          An email can be sent to many people at the same time          Using internet to send messages saves time as do not have to spend time visiting/being on the phone to somebody          Emails can be responded to when it is convenient</p> <p><i>Drawbacks</i>          Students can spend too much time on social network sites rather than studying          Spam emails can be received which use up storage space          Phishing emails can trap you into giving out personal information          Viruses can be sent by email          With email/messaging is sometimes difficult to clarify what is meant unlike a normal phone call          Not everyone has an internet connection          Email/messaging – confidential information can be easily forwarded and if done in error could easily end up in the wrong hands.</p>	<b>8</b>
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## June 2018 – P12

- 6 Many computer users often confuse the terms the 'internet' and the 'World Wide Web'.

Explain what is meant by the term the 'World Wide Web'.

Answer:

6	<p><b>Six from:</b></p> <p>It can be accessed via the internet          It is accessed using web browsing software          It was invented by (English scientist) Tim Berners-Lee (in 1989)          HyperText Markup Language (HTML) is the markup (formatting) language for the world wide web          Web pages are primarily text documents formatted and annotated using Hypertext Markup Language (HTML)          Uses Uniform Resource Locator (URL) (an address that is unique and used to identify each resource on the world wide web)          Uses Hypertext Transfer Protocol (HTTP) allowing for the retrieval of linked resources from across the world wide web          Uses HTTPS to provide secure websites          (In addition to formatted text,) web pages may contain images, video, and software components          Hyperlinks allow users to navigate between web pages          Comprises websites made up of a number of web pages (with a common theme)          Is basically a system of web servers (that support specially formatted documents).</p>	6
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## June 2018 – P13

11 Many people use their mobile phones for internet access.

Discuss the advantages and disadvantages of mobile networks.

### Answer:

11	<p>To be marked as a level of response:</p> <p><b>Level 3 (7–8 marks)</b>  Candidates will describe the advantages and disadvantages of mobile networking compared to other types of network.  The issues raised will be justified.  The information will be relevant, clear, organised and presented in a structured and coherent format.  Specialist terms will be used accurately and appropriately</p> <p><b>Level 2 (4–6 marks)</b>  Candidates will describe the advantages and disadvantages of mobile networking compared to at least one other type of network although development of some of the points will be limited.  For the most part the information will be relevant and presented in a structured and coherent format.  Specialist terms will be used appropriately and for the most part correctly.</p> <p><b>Level 1 (1–3 marks)</b>  Candidates may only address one side of the argument, and give basic advantages/disadvantages.  Answers may be simplistic with little or no relevance.  There will be little or no use of specialist terms.</p> <p><b>Level 0 (0 marks)</b>  Response with no valid content.</p>	8
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**Question 11****Answer (Continued):**

Candidates may refer to e.g.:

*Advantages*

Mobile networks generally offer much more coverage than other systems such as WiFi...

...which forces users to depend upon hotspots in each area visited

4G offers a coverage of 30 miles and more and with overlapping network ranges so users are usually assured of complete connectivity at all times

Big problem with WiFi networks is online security so mobiles more secure

Mobile devices can be used out in the field

Portability is one of the main advantages of mobile computing, you are not restricted to one location in order for you to get jobs done

*Disadvantages*

Mobile networks are more expensive than traditional WiFi networks to use

Quality of connectivity can be poor if you are not near any of the normal connections (Wifi, 3G, 4G)

Mobile VPNs are unsafe to connect to, and also syncing devices might also lead to security concerns

Power consumption- due to the use of batteries in these devices, these do not tend to last long.

## November 2018 – P11 & P13

- 1 Tick the **four** most accurate statements regarding peer-to-peer and client-server networks.

	✓
Peer-to-peer networks must have a central server.	
Client-server networks generally offer greater security than peer-to-peer networks.	
Peer-to-peer networks can support millions of users with no loss of performance.	
The server will determine which users can access the files on a client-server network.	
In a client-server network each client functions both as a client and as a server simultaneously.	
If one computer crashes it has no effect on the other users in a client-server network.	
A client-server network is cheaper to set up than a peer-to-peer network.	
Peer-to-peer networks always require an employee to manage the network.	
In a peer-to-peer network only one computer is allowed to use the printer.	
In a peer-to-peer network computers can communicate and share files with every other computer on the network.	

[4]

**Question 1****Answer:**

1	<table><tr><td>Peer-to-peer networks must have a central server.</td><td></td></tr><tr><td>Client-server networks generally offer greater security than peer-to-peer networks.</td><td>✓</td></tr><tr><td>Peer-to-peer networks can support millions of users with no loss of performance.</td><td></td></tr><tr><td>The server will determine which users can access the files on a client-server network.</td><td>✓</td></tr><tr><td>In a client-server network each client functions both as a client and as a server simultaneously.</td><td></td></tr><tr><td>If one computer crashes it has no effect on the other users in a client-server network.</td><td>✓</td></tr><tr><td>A client-server network is cheaper to set up than a peer-to-peer network.</td><td></td></tr><tr><td>Peer-to-peer networks always require an employee to manage the network.</td><td></td></tr><tr><td>In a peer-to-peer network only one computer is allowed the printer.</td><td></td></tr><tr><td>In a peer-to-peer network computers can communicate and share files with every other computer on the network.</td><td>✓</td></tr></table>	Peer-to-peer networks must have a central server.		Client-server networks generally offer greater security than peer-to-peer networks.	✓	Peer-to-peer networks can support millions of users with no loss of performance.		The server will determine which users can access the files on a client-server network.	✓	In a client-server network each client functions both as a client and as a server simultaneously.		If one computer crashes it has no effect on the other users in a client-server network.	✓	A client-server network is cheaper to set up than a peer-to-peer network.		Peer-to-peer networks always require an employee to manage the network.		In a peer-to-peer network only one computer is allowed the printer.		In a peer-to-peer network computers can communicate and share files with every other computer on the network.	✓	4
Peer-to-peer networks must have a central server.																						
Client-server networks generally offer greater security than peer-to-peer networks.	✓																					
Peer-to-peer networks can support millions of users with no loss of performance.																						
The server will determine which users can access the files on a client-server network.	✓																					
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If one computer crashes it has no effect on the other users in a client-server network.	✓																					
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In a peer-to-peer network only one computer is allowed the printer.																						
In a peer-to-peer network computers can communicate and share files with every other computer on the network.	✓																					

- 8 Video-conferencing is a commonly used method of communication. It has an effect on different sections of society.

Describe the impact of video-conferencing on the following groups of people.

General public .....

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Medicine – doctors, nurses and patients .....

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Education – teachers and students .....

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**Question 8****Answer:**

8	<p><b>Two</b> points from each section:</p> <p>General public:          More people are able to use personal video-conferencing systems as equipment/broadband has become affordable to the general public          More people are able to use personal video-conferencing systems as hardware has improved in quality          Availability of freeware has made software-based video-conferencing accessible to many          Enables more people to stay in contact with family/friends when far apart/when it is difficult to travel          Hard-of-hearing/people with speech difficulties use video-conferencing as a means of communicating with each other in sign language          Can result in loss of social interaction</p> <p>Medicine:          Patients who are bed-ridden may contact nurses and physicians (to show symptoms)          Doctors and/or other paramedical professionals can discuss cases across large distances          Rural areas can use this technology for diagnostic purposes          Doctors can teach student doctors/student doctors can observe surgical operations</p> <p>Education:          Video-conferencing provides students with the opportunity to learn by participating with students from other countries/schools          Teachers and lecturers worldwide can be virtually brought to remote or otherwise isolated educational facilities          Students who are ill can still take part in lessons          Students from diverse communities and backgrounds can come together to learn about one another          Through video-conferencing, students can virtually visit museums and educational facilities          Universities with several campuses can collaborate and share lecturers.</p>	6
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## November 2018 – P12

- 7 There are a number of communication technologies and their associated networks used for transmitting data.

Describe the following types including their suitability, with reasons, for use in a video-conference.

(a) ADSL

Answer:

7(a)	<p><b>Two from:</b></p> <p>Asymmetric/asynchronous digital subscriber line            Bandwidth and bit rate is greater toward the subscriber/downstream than the reverse/upstream hence asymmetric/asynchronous            ISPs usually provide ADSL as a service for consumers to receive Internet access in a relatively passive mode</p> <p>The maximum reliable speed which could be achieved is usually lower than that which modern video-conferencing systems require. <b>1 mark</b></p>	<b>3</b>
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(b) SDSL

Answer:

7(b)	<p><b>Two from:</b></p> <p>Symmetric/synchronous digital subscriber line            Bandwidth and bit rate in the downstream direction/from the network to the subscriber is identical to the bandwidth in the upstream direction/from the subscriber to the network            SDSL is generally aimed at business customers/ADSL is marketed at private as well as business customers</p> <p>SDSL is more expensive than ADSL but a better choice for high-quality video-conferencing as allows much higher bandwidth. <b>1 mark</b></p>	<b>3</b>
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**Question 7, Part (c)**

(c) ISDN

**Answer:**

7(c)	<p><b>Two from:</b></p> <p>Integrated Services Digital Network          Allows simultaneous digital transmission of voice, video, data, other network services over public switched telephone network          Circuit-switched telephone network system which also provides access to packet switched networks          Results in potentially better voice quality than an analogue phone can provide</p> <p><b>One from:</b></p> <p>ISDN video-conferencing systems still in use as high-definition is achievable using a Primary Rate Interface (PRI)          Is very cost prohibitive and can achieve the same results with SDSL for a lot less.</p>	<b>3</b>
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- 12** A company is planning a new computer network and is faced with choosing between a peer-to-peer and a client-server network.

Discuss the advantages and disadvantages of a peer-to-peer network compared with a client-server network.

Answer:

12	<p><b>Eight from:</b></p> <p><b>Advantages:</b>          Cost of buying a server is saved ...          ... does not need a server because individual workstations are used to access the files          No need to pay for System Administrator/network technicians because each user sets their own permissions as to which files they are willing to share          Much easier to set up than a client-server network as it does not need specialist knowledge          The over-all cost of building and maintaining this type of network is comparatively cheaper          If one computer fails it will not disrupt any other part of the network except the files on that computer are not available to other users at that time/in client-server network, if server goes down whole network gets affected</p> <p><b>Disadvantages:</b>          Files and folders are difficult to recover as they cannot be centrally backed up/each computer has to have its own back-up system          Files and resources are more difficult to share          There is less security other than permissions/users often do not need to log onto their workstations.          The system is not centralised so it is difficult to administer/one person cannot determine the accessibility setting of whole network          Each computer is fulfilling more than one role, it may be printing or file sharing so performance can be slower          Security is more expensive as each computer must have its own anti-virus scanner          Difficult to have more than a few users          If sharing a large database which increases in size computers would need to increase their storage capacity/client-server which only needs to upgrade server          Because each computer might be being accessed by others it can slow down the performance for the user unlike client-server          Ensuring that viruses are not introduced to the network it is the responsibility of each individual user/client-server has central virus protection distributed to each computer.</p>	8
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## March 2018 – P12

2 Tick the **four** most accurate statements regarding encryption protocols.

	✓
None of the web browsers currently in use support TLS.	
SSL stands for Secure Socket Layer.	
TLS was used before SSL came into being.	
TLS and SSL are protocols that provide security of communication in a network.	
SSL uses asymmetric cryptography only.	
Encryption protocols prevent hackers from intercepting a message.	
TLS stands for Transport Layer Socket.	
Client-server applications use TLS in a network to try to prevent eavesdropping.	
Encryption protocols enable credit card payments to be made securely.	
SSL does not require a handshake to be carried out.	

[4]

Answer:

2	None of the web browsers currently in use support TLS.	
	SSL stands for Secure Socket Layer.	✓
	TLS was used before SSL came into being.	
	TLS and SSL are protocols that provide security of communication in a network.	✓
	SSL uses asymmetric cryptography only.	
	Encryption protocols prevent hackers from intercepting a message.	
	TLS stands for Transport Layer Socket.	
	Client-server applications use TLS in a network to try to prevent eavesdropping.	✓
	Encryption protocols enable credit card payments to be made securely.	✓
	SSL does not require a handshake to be carried out.	

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4 A company has decided to extend its intranet into an extranet.

(a) Describe the characteristics of a company intranet.

Answer:

4(a)	<p><b>Three from:</b></p> <p>A private (computer) network used within one organisation          Can only be accessed by workers within the organisation/ restricted access network          Based on internet technologies/TCP/IP protocols          Used to share information within the organisation          Tends to be a LAN.</p>	<b>3</b>
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(b) Describe the characteristics of a company extranet.

Answer:

4(b)	<p><b>Three from:</b></p> <p>A website that allows controlled access to authorised users to an organisation's network          Usually only allows access to a subset of the information on the organisation's intranet          Provides access to specific services without granting access to the organisation's entire network          Usually operates within a VPN framework          Usually operates over a public telecommunications network.</p>	<b>3</b>
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- 6 Jasvir works in a town in the south of India. He uses email to stay in contact with his parents who live in the north.

Apart from email and video conferencing, describe **four** other ways he could use the internet to communicate with his parents, giving a different drawback for each method.

Answer:

6	<p><b>Four matched pairs from:</b></p> <p>Instant messaging where Jasvir types a message and the parent <u>immediately</u> sees it pop up in their IM window          There is no time to reflect on the message being sent unlike an email where the draft can be reviewed before sending /limited length of message/could be impersonal no voice/sound</p> <p>VoIP - Voice Over Internet Protocol Jasvir would use a microphone connected to a computer/speaks using a VoIP phone and the software converts it into a format that can be sent over the internet          The person receiving the call must also have VoIP application running in order to listen/can be affected by bandwidth issues</p> <p>Social networking sites where Jasvir could post a message with pictures/video on his page/area          Can later regret posting pictures or comments that were thought funny at the time/other people apart from parents may be able to see site thereby losing privacy/other people may message you interrupting flow</p> <p>Blog/microblog – Jasvir could use a website writing about what is happening to him          May not get immediate feedback/parents will not have immediate feedback</p> <p>Chat rooms – Jasvir could meet his parents in a chat room and chat to them by typing a message          Parents might not be skilled chatters and not know how to keep conversation private/other people apart from parents may be able to enter room thereby losing privacy.</p>	8
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7 Codecs are used in video conferencing.

Describe how data is transmitted and converted in a video conference.

Answer:

7	<p><b>Six from:</b></p> <p>Video-conferencing systems require digital compression of audio and video streams (in real time)          The hardware or software that performs compression is called a codec...          ... a coder/decoder          Compression ratios of 50:1 are achieved          The digital stream is subdivided into data packets...          ...which are then transmitted through a digital network          Each packet has a 'header' that identifies its contents          Protocol used is usually determined by the need to have reliable or unreliable communications          TCP is a protocol designed for error free transmission of data when delivery needs to be assured          TCP will retransmit missing packets when data is lost          TCP protocol can cause delays and reduced throughput          User Datagram Protocol (UDP) is a less reliable protocol in which any data lost during transmission is not retransmitted          Video-conferencing is better suited to UDP than TCP because packets that arrive late would spoil the conference.</p>	6
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## June 2019 – P11

- 4 Most schools have introduced e-safety lessons because teachers are becoming concerned about the way their students use the internet when not in school. One of their concerns is that students may be revealing personal information about themselves.

Describe the problems associated with this and other problems that arise from students using the internet.

### Answer:

4	<p>Six from:</p> <ul style="list-style-type: none"> <li>Unauthorised access to personal information</li> <li>The risk of being subject to grooming by those with whom they make contact on the internet</li> <li>The sharing / distribution of personal images without an individual's consent or knowledge</li> <li>Inappropriate communication / contact with others, including strangers</li> <li>Cyber-bullying by fellow students</li> </ul> <p><i>Other problems</i></p> <ul style="list-style-type: none"> <li>Access to unsuitable video / internet games</li> <li>An inability to evaluate the quality, accuracy and relevance of information on the internet</li> <li>Plagiarism and copyright infringement</li> <li>Illegal downloading of music or video files...</li> <li>...giving rise to the potential for excessive use which may affect the social and emotional development and learning of the student</li> <li>Access to illegal, harmful or inappropriate images or other content</li> </ul> <p>Must have at least two of each to gain full marks</p>	6
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- 5 Many companies with different branches have Local Area Networks (LANs) which connect to form a Wide Area Network (WAN).

Compare and contrast the characteristics of a LAN and a WAN owned by one company.

Answer:

5	<p>Six from:</p> <p>Both are used to connect computers together...          ...providing all the advantages of a computer network          Both can be connected using copper cable or fibre optic cable          Both are used to share files</p> <p>Data transfer rates are faster within a LAN          Data transmission errors are fewer within a LAN          WANs cover a larger geographical area than a LAN          LAN can be more secure as can be confined to one building and not connected to outside users/hackers          As WANs tend to consist of more complex systems so they are less fault tolerant          LAN shares the information needed by each branch whereas WAN shares the information needed by all branches</p> <p>Must have at least one difference and one similarity to gain full marks</p>	6
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**14** Many students use the internet in school to search for information to help with their classwork.

Apart from e-safety, discuss the benefits and drawbacks of students using the internet for this purpose.

Answer:

14	<p>This question to be marked as levels of response:</p> <p><b>Level 3 (7–8 marks)</b>  Candidates will discuss the benefits and drawbacks of using the internet  The information will be relevant, clear, organised and presented in a structured and coherent format  There may be a reasoned conclusion/opinion  Specialist terms will be used correctly and appropriately</p> <p><b>Level 2 (4–6 marks)</b>  Candidates will discuss the benefits and drawbacks of using the internet although development of some of the points will be limited to one side of the argument  For the most part, the information will be relevant and presented in a structured and coherent format  Specialist terms will be used appropriately and for the most part correctly</p> <p><b>Level 1 (1–3 marks)</b>  Candidates will present benefits or drawbacks of using the internet  There will be little or no use of specialist terms  Answers may be simplistic with little or no relevance</p> <p><b>Level 0 (0 marks)</b>  Response with no valid content.</p>	<b>8</b>
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**Question 14****Answer (Continued):**

	<p>Candidates may refer to e.g.</p> <p>Benefits</p> <p>Internet tends to be up to date</p> <p>Internet has vast amounts of information/ wide range of information/ wide variety of sources</p> <p>Use of search engines makes it quicker to find information than looking in books</p> <p>Multimedia sources are available on the internet unlike text books</p> <p>Interactive sites can be found on the internet unlike text books</p> <p>Drawbacks</p> <p>Danger of accessing inappropriate websites.</p> <p>Can take long time to find required information</p> <p>Can access biased/inaccurate websites</p> <p>Lack of expertise leads to inefficient searching</p> <p>Easy to plagiarise information</p> <p>The internet is not regulated</p> <p>Internet provides a variety of answers so it is difficult to decide which answer is correct</p>	
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## June 2019 – P12

- 5 A large company with branches in many countries has decided to install a Virtual Private Network (VPN).

(a) Describe the purpose of such a network.

Answer:

5(a)	<p><b>Two from:</b></p> <p>To enable organisations to communicate over a large area <u>securely</u></p> <p>To enable employees to transmit data <u>securely</u></p> <p>To enable employees to access the company's computer network remotely / from home <u>securely</u></p> <p>To restrict which external users are able to use the company's network</p> <p>To restrict the resources the external user is permitted to use.</p>	<b>2</b>
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**Question 5, Part (b)**

(b) Explain how it achieves this purpose.

Answer:

5(b)	<p><b>Four from:</b></p> <p>This process is called tunnelling as it uses a secure means to tunnel through a publicly accessible network</p> <p>It uses encryption ...</p> <p>... involves the use of private and / or public keys ...</p> <p>... scrambles data so that only the key holder can decrypt / understand it</p> <p>... data remains encrypted throughout transmission and is only decrypted at the destination computer</p> <p>It can use IPsec ...</p> <p>... is a network protocol suite that encrypts packets of data sent over a network ...</p> <p>... protects data flows between a pair of hosts (host-to-host) / between a pair of security gateways (network-to-network) / between a security gateway and a host (network-to-host)</p> <p>It uses a firewall ...</p> <p>... which (monitors and) controls the incoming and outgoing network traffic ...</p> <p>... establishes a barrier between a trusted, secure internal network and another outside network or computer</p> <p>It uses authentication, authorisation, and accounting / AAA ...</p> <p>... AAA server is a program that handles user requests for access to computer resources ...</p> <p>... AAA server typically interacts with network access and gateway servers / with databases and directories containing user information</p> <p>It can use TLS / SSL ...</p> <p>... uses asymmetric encryption to establish the session ...</p> <p>... symmetric encryption for the main conversation.</p>	<b>4</b>
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- 6 Video-conferencing is a commonly used method of communication. It has affected different sections of society.

Describe **two** effects of video-conferencing for each of the following groups of people:

Answer:

6	<p><b>Six from:</b></p> <p><i>Legislators</i> (government members who make legislation or laws)</p> <p><b>Two from:</b>          Local government representatives would no longer have to attend a meeting far from their home leading to savings in travel expenses          Representatives can take part in and observe a meeting happening in more than one location          Problems with video transmissions could lead to misunderstandings / delays in passing laws          Saves the task of booking a room for a meeting</p> <p><i>Business people</i></p> <p><b>Two from:</b>          Do not have to pay for air / train tickets / car running costs to meet with customers          Do not have to pay for hotel accommodation to meet with customers          Saves the cost of hiring a venue for a meeting          When vital workers in a business have to travel, the business is left short-handed, possibly for days          Flight cancellations, airport delays, traffic jams will no longer be reasons or excuses for missing meetings and conferences          Can increase productivity as a worker who has a sick child, for example, may be able to hold an important meeting even if they have to stay home for the day          Workers can easily share a word-processed document / spreadsheet with a manager          Much less personal interaction</p> <p><i>Television news presenters</i></p> <p><b>Two from:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Can hold discussions with more than one person who normally would not travel just for an interview</li> <li><input type="checkbox"/> Can speak with correspondents based in different countries <u>simultaneously</u></li> <li><input type="checkbox"/> Do not have to wait for eye-witnesses to travel to the tv centre</li> <li><input type="checkbox"/> Presenters do not have to travel to dangerous areas</li> <li><input type="checkbox"/> Interviewees do not have to travel and risk arrest / terrorists / attack.</li> </ul>	6
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## June 2019 – P13

**10** Discuss the advantages and disadvantages of client-server and peer-to-peer networks.

Answer:

10	<p>To be marked as a level of response:</p> <p><b>Level 3 (7–8 marks)</b>  Candidates will describe the advantages and disadvantages of both types of network.  The issues raised will be justified.  The information will be relevant, clear, organised and presented in a structured and coherent format.  Specialist terms will be used accurately and appropriately.</p> <p><b>Level 2 (4–6 marks)</b>  Candidates will describe the advantages and disadvantages of at least one type of network although development of some of the points will be limited.  For the most part the information will be relevant and presented in a structured and coherent format.  Specialist terms will be used appropriately and for the most part correctly.</p> <p><b>Level 1 (1–3 marks)</b>  Candidates may only address one side of the argument and give basic advantages / disadvantages.  Answers may be simplistic with little or no relevance.  There will be little or no use of specialist terms.</p> <p><b>Level 0 (0 marks)</b>  Response with no valid content.</p>	<b>8</b>
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**Question 10****Answer (continued):**

	<p>Candidates may refer to e.g.</p> <p><b>Client-server:</b>  A centralised database of usernames and passwords on a server makes client-server networks more secure  In a client–server network, if the server goes the down whole network gets affected  With a client-server network users do not need to worry about making backup ...  ... this is managed centrally by a network manager  Upgrading the network is easier with a client-server network as it is easier to just upgrade the server  Easier for users to access the server in a client-server network using alternative devices  As new information is uploaded in a database, each computer need not have its own storage capacity increased as may be the case in peer-to-peer networks</p>	
10	<p><b>Peer-to-peer:</b>  There is no need to pay for a network manager with a peer-to-peer network  With a peer-to-peer network you do not have to worry about buying expensive hardware such as servers ...  ... does not need a server because individual workstations are used to access the files  With a peer-to-peer network everything is decentralised so it is more difficult to manage the network  Much easier to set up than a client-server network as it does not need specialist knowledge  Because each computer might be being accessed by others it can slow down the performance for the user unlike client-server  The over-all cost of building and maintaining this type of network is comparatively cheaper.</p>	

## November 2019 – P11 & P13

- 7 A hospital has installed video-conferencing equipment so that senior doctors in the hospital can stay in touch with other doctors who work in areas away from the hospital.

Evaluate the impact of video-conferencing on **both** groups of doctors.

Answer:

7	<p><b>Eight from:</b></p> <p><b>Benefits</b>          Both groups of doctors will not waste time travelling to a conference/meeting with each other          Both groups of doctors will save expense of travelling to a conference/meeting with each other          All doctors will save time by not staying overnight          Doctors less likely to be fatigued if they have not had to travel long distances so able to perform better at the meeting          Saves doctors time printing out large amounts of documents          Doctors are less likely to misplace documents ...          ... as electronic documents can be viewed online          It is safer as accidents can happen on the roads          Meetings can be called at short notice saving doctors time in preparation for a meeting          It is more environmentally friendly as less car movement is needed          It makes it easier for the doctors who do not work in the hospital to liaise when necessary/allows hospital doctors to share new treatments with other doctors          Hospital doctors can demonstrate procedures/treatments to other doctors</p>	8
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**Question 7****Answer (Continued):**

	<p><b>Drawbacks</b></p> <p>Confidential documents may need to be seen in their original form by both sets of doctors</p> <p>There can be poor quality of the video because of bandwidth problems</p> <p>Lack of bandwidth can lead to problems with time lag</p> <p>Not all countries have sufficient bandwidth to support video conferencing</p> <p>Interruption to, or breakdowns of, the transmission can occur</p> <p>Power cuts/outages are common in some countries, leading to breakdown of transmission</p> <p>Both sets of doctors may be concerned that hackers may attempt to hack into the video conference</p> <p>Hackers could gain access to patient details</p> <p>Some video conferences do not have a password/you can just dial into a video conference so hackers could gain access easily</p> <p>Difficult to allow doctors to answer in turn</p> <p>Might be difficult to see all doctors to see who is contributing</p> <p>Doctors may be put off by the camera, as many people are self-conscious when being videoed</p> <p>Doctors away from the hospital may incur costs due to obtaining video conferencing equipment</p> <p>At least two of each are required to obtain full marks</p> <p>There must be a proper evaluation to obtain full marks</p>	
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- 9 Computer networks can often be classified as consisting of two types, peer-to-peer and client-server networks.

Describe a peer-to-peer network.

**Answer:**

9	<p><b>Five from:</b></p> <p>A peer-to-peer network can consist of two or more PCs connected and sharing resources ...</p> <p>... without going through a separate server computer</p> <p>It can also be a permanent infrastructure that links a half-dozen computers in a small office over copper wires</p> <p>It can be a network on a much larger scale in which special protocols and applications set up direct relationships among users over the Internet</p> <p>Each peer computer has equal privileges with each other</p> <p>Peer computers allow a portion of their resources to be directly available to other peer computers ...</p> <p>... such as processing power, disk storage or network bandwidth.</p>	5
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## November 2019 – P12

6 Many organisations have an intranet and often extend it to form an extranet.

Describe, using examples, what an intranet is and how it could be extended into an extranet.

Answer:

6	<p><b>Eight</b> from:</p> <p>A private computer network used within one organisation          Can only be accessed by workers within the organisation/ restricted access network          Users tend to need user ids and passwords to prevent outsiders using the intranet          Based on internet technologies/TCP/IP protocols          There is a client-server relationship set up between computers and the servers          Used to share information/send emails within the organisation          Tends to be a LAN          Has greater security/less susceptible to hackers/viruses than the internet          Intranets have web pages about company events, health and safety policies and staff newsletters          Contains forms for workers to complete such as claiming expenses/requesting holidays          Extranet is a means of extending an organisation's intranet for use by <u>selected</u> people (outside the organisation)/so that employees can work remotely          If staff working outside the organisation can access an intranet by using a VPN this becomes an extranet          Extranet is set up by providing a secure link/firewall to the intranet using the internet</p> <p>Examples (max 2 marks) of extranet use could be:          A company could provide access to a supplier for online ordering, order tracking and inventory management          A hospital providing local doctors with access to a booking system so they can make appointments for their patients          Pupils could use the school's intranet to submit work from home          Employees could use the company intranet when working from home</p> <p>Maximum of 7 marks with no examples</p>	8
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9 Evaluate the use of HTTPS in websites.

Answer:

9	<p>To be marked as a level of response:</p> <p><b>Level 3 (7–8 marks)</b></p> <p>Candidates will describe the advantages and disadvantages of HTTPS The issues raised will be justified. The information will be relevant, clear, organised and presented in a structured and coherent format. There will be a reasoned conclusion Specialist terms will be used accurately and appropriately</p> <p><b>Level 2 (4–6 marks)</b></p> <p>Candidates will describe the advantages and disadvantages of HTTPS although development of some of the points will be limited For the most part the information will be relevant and presented in a structured and coherent format. Specialist terms will be used appropriately and for the most part correctly.</p> <p><b>Level 1 (1–3 marks)</b></p> <p>Candidates may only address one side of the argument, and give basic advantages/disadvantages Answers may be simplistic with little or no relevance. There will be little or no use of specialist terms.</p> <p><b>Level 0 (0 marks)</b></p>	8
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**Question 9****Answer (continued):**

	<p>Response with no valid content.</p> <p>Candidates may refer to e.g.</p> <p>Disadvantages</p> <p>HTTPS uses a lot of server resources ...</p> <p>... requires processing power and memory for encryption</p> <p>HTTPS introduces latencies/delays</p> <p>SSL connections take longer to set up with more roundtrips</p> <p>Browser caching does not work properly</p> <p>Modern sites will run slowly without browser caching</p> <p>Need to buy an SSL certificate issued by certificate authorities</p> <p>It is possible to make your own certificate but other users will not trust it so you need to buy one</p> <p>Warnings can arise that despite using SSL a web page is partially serving insecure content</p> <p>The browser may not want users to think a site is totally secure but warning can be off-putting to many users</p> <p>There are proxy caching problems</p> <p>Everything is encrypted including packet headers and content</p> <p>Any caching that might have happened between the points at which data is encrypted and decrypted is blocked</p>	
9	<p>Advantages</p> <p>Messages can't be read by any third-party</p> <p>A certificate guarantees the information a browser is receiving originates at the expected domain</p> <p>It's a guarantee that when a user sends sensitive data, it's being sent to the right place, and not to a malicious third party</p> <p>HTTPS connections make man-in-the-middle attacks much more difficult to execute</p> <p>Search engines list HTTPS websites higher than sites without HTTPS</p> <p>The green padlock indicates that your site provider takes security seriously and this gives users confidence</p>	

- 12** Laura, the manager of a new company, has just purchased some computers for workers to use. With the increase in the use of ransomware by hackers she has decided that the workers will not be allowed access to the internet. However, she needs to decide whether or not to connect the computers together to form a network.

Without referring to the internet, discuss the advantages and disadvantages of networking these computers.

Answer:

12	<p><b>Eight</b> from:</p> <p>Advantages</p> <p>Easier for workers to share work/files in projects          Can access work from any computer          Easier for network manager to roll out new software          Easier for managers to monitor workers' progress          Peripherals can be shared so fewer needed, leading to lower cost in the future          Company can have an intranet for workers to access          If a server is used workers do not need to worry about making backups</p> <p>Disadvantages</p> <p>A server may be required to cope with extra computers, so more expensive          Extra network points/cabling may be needed, which leads to more cost          If the server breaks down company projects might become inaccessible          Viruses are easier to transmit from one computer to another          Easier for disgruntled employees to hack into colleagues' work          A network manager/administrator may need to be employed, leading to extra costs</p> <p><b>Must have at least two of each to gain full marks</b>  <b>Needs to be a proper discussion to gain full marks</b></p>	<b>8</b>
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## March 2019 – P12

- 6 Many mobile phone companies, in the past, persuaded customers to move from 3G to 4G.

Compare and contrast 3G and 4G technologies.

Answer:

6	<p><b>Six from:</b></p> <p><i>Similarities:</i>          Both are types of mobile network          Both allow smart phones to access the WWW          Both allow video calling on phones          Both allow emails to be sent by phone          Both allow videos and music to be downloaded to a phone          Both allow phones to be used as a SATNAV</p> <p><i>Differences:</i>          4G has faster download speeds than 3G          4G enables smoother browsing with web pages failing to load, very rare unlike 3G          4G allows videos and music to be <u>streamed</u> without the buffering and freezing found on 3G networks          Batteries last longer on 3G than on 4G          3G data allowance tends to be cheaper than 4G</p> <p><b>Must have at least one of each to gain full marks.</b></p>	6
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- 8 Rishu has been asked by the directors of the company she works for to set up a fully functioning video-conferencing room. It will be used by several workers at the same time to communicate with the directors who will be in a different building.

Describe, including a use of each item, the hardware she will need to purchase.

Answer:

8	<p><b>Six from:</b></p> <p>Server/computer to handle video-conferencing software          Laptops/PCs/tablets for each participant to enter data          Microphones to input participants' voices/sound          Large screen/monitor so that all the directors can be seen          Speakers for participants to hear what the directors are saying          Cameras to input pictures of participants          Router to connect to internet/codec to connect to telephone network.</p>	6
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